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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/162,992	09/30/1998	TADASHI SENOO	P98-1703	9466

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EXAMINER

DOVE, TRACY MAE

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 11/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/162,922

Applicant(s)

OSAKA, TOMOHIKO

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2-9 and 12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-9 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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### **DETAILED ACTION**

This Office Action is in response to the communication filed on 8/20/02. Applicant's arguments have been considered, but are not persuasive. Claims 2-9 and 12 remain rejected.

This Action is made FINAL, as necessitated by amendment.

### ***Claim Objections***

✓ Claim 12 is objected to because of the following informalities: in line 8 it appears "ethyl carbonate" should recite "ethylene carbonate". Appropriate correction is required.

✓ Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-9 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites "...a non-aqueous solvent at least including propylene carbonate in an amount ranging from 10 mol% to 75 mol%, ethyl carbonate and a high-molecular weight material having a number average molecular weight...", which is confusing. Specifically, the

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non-aqueous solvent does not include the high-molecular weight material. See page 12 of the specification that states the gel electrolyte material is composed of an electrolyte salt, a non-aqueous solvent and a high-molecular material. Examiner suggests amending claim 12 to recite “a gel electrolyte comprising an electrolyte salt, a non-aqueous solvent and a high-molecular weight material having a number average molecular weight ranging from 5000 to 500000 wherein the non-aqueous solvent at least includes propylene carbonate in an amount ranging from 10 mol% to 75 mol% and ethylene carbonate.”

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akashi, EP 0,724,305 A1, in view of Ozaki et al., US 5,522,127.

Akashi teaches a gel electrolyte and a lithium secondary cell using the gel electrolyte. The cell includes a positive electrode which may be a lithium/transition metal composite oxide, a negative electrode which may be a carbonaceous material such as graphite and the gel electrolyte. See page 5, lines 8-16. The non-aqueous solvent and the electrolyte salt used for the production of the gel electrolyte may be those generally used for the production of a lithium secondary cell. The solvent may be ethylene carbonate (EC), propylene carbonate (PC),  $\gamma$ -butyl lactone or mixtures thereof. The preferred salt is  $\text{LiPF}_6$ . See page 4, lines 1-9. The gel

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electrolyte further includes a polymer having a side chain to which at least one nitrile group is bonded. The polymer is preferably polyacrylonitrile (PAN) and has a number-average molecular weight ranging from about 50,000 to about 500,000. See page 3, lines 45-59. A molar ratio of a monomer as a repeating unit of the PAN to the non-aqueous solvent is suitably in the range of 5:95 to 30:70 though it varies depending upon kinds of the non-aqueous solvent, the gelling agent and the electrolyte salt used. The lithium salt may be in a concentration of 0.4 to 2 M. See page 4, lines 13-17 and 31-32. Tables 1 and 2 teach a gel electrolyte including PAN, EC and PC where PC is 10-70 mol% of the gel electrolyte.

Akashi does not specifically teach the negative electrode of claim 12. Akashi teaches lithium secondary cells are well known to have a negative electrode made of a material such as lithium, a lithium alloy or a carbonaceous material capable of occluding lithium (page 2, lines 12-17). Akashi further teaches examples of suitable negative electrode activating ingredients may include metallic lithium, a lithium alloy and a carbonaceous material capable of occluding lithium, such as graphite (see page 5, lines 12-16).

However, Ozaki teaches a non-aqueous electrolyte secondary cell having a negative electrode of carbon material to which intercalation by charging and deintercalation by discharging of lithium is possible (col. 1, lines 8-12). The negative electrode is made from mesophase graphite particles. The mesophase graphite particles are produced from micro beads of mesophase carbon made from pitch (col. 3, lines 1-7). The negative electrode was fabricated by mixing the mesophase graphite particles with styrene butadiene rubber (binder) and carboxymethyl cellulose to obtain a paste. A copper foil (current collector) of 0.02 mm thickness was coated with the paste on both surfaces and then pressed to 0.20 mm thickness.

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The thickness of the coated active material layer is 0.18 mm [0.20 mm (coating + current collector) - 0.02 mm (current collector)]. A thickness of 0.18 mm is equivalent to 180  $\mu\text{m}$ .

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have found it obvious to use the negative electrode of Ozaki for the negative electrode of Akashi. Ozaki teaches that the negative electrode including mesophase graphite leads to smooth intercalating of lithium at charging over a wide temperature range resulting in an increased cell capacity (col. 3, lines 12-14). Akashi teaches the negative electrode may be a carbonaceous material such as graphite that is capable of occluding lithium (intercalating). Both Ozaki and Akashi teach nonaqueous secondary cells having a negative electrode including graphite and a nonaqueous electrolyte comprising a lithium salt and a mixed solvent (see col. 4, lines 54-58 of Ozaki). One of skill would be motivated to use the graphite negative electrode of Ozaki as the graphite negative electrode of Akashi because both materials are capable of occluding lithium and the graphite negative electrode of Ozaki leads to increased cell capacity.

### ***Response to Arguments***

Applicant's arguments filed 8/20/02 have been fully considered but they are not persuasive.

Applicant argues Akashi merely discloses a negative electrode that can be prepared by cutting a metallic lithium plate into a sheet material. Examiner disagrees with Applicant's analysis of the Akashi reference. As stated above, Akashi clearly teaches a negative electrode including a carbonaceous material, such as graphite, capable of occluding lithium (col. 5, lines

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12-16). Regarding the arguments presented on page 3, last paragraph-page 4 of the amendment, Applicant has not presented any persuasive evidence or support for the assertion that Akashi teaches away from a combination with Ozaki, the Examiner has used improper “hindsight”, or why one of skill in the art would not be motivated to combine the teaches of Akashi and Ozaki. Furthermore, Akashi does not teach away from the claimed invention (a negative electrode including graphite is disclosed by the reference). Thus, Applicant’s arguments are not persuasive.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The

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Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

November 5, 2002

A handwritten signature in black ink, appearing to read 'Carol Chaney', with a stylized, flowing script.

**CAROL CHANEY  
PRIMARY EXAMINER**